

DEVICES AND METHODS FOR THE RAPID, RELIABLE DETECTION AND DETERMINATION OF ACRYLAMIDE CONCENTRATION IN FOOD SUBSTANCES AND PREVENTION OF ACRYLAMIDE FORMATION IN THE SAME

Abstract

The present invention includes a device and associated analytical method to use for the sensitive detection and accurate, rapid determination of acrylamide in food substances. The present invention also relates to the use of a kit device and associated analytical method in which a user can quickly and easily ascertain the amount of acrylamide in food substances with ease and in any location, including a non-laboratory environment. Such detection device and method may be comprised of a sample collection area on which a sample of food, after being mixed in a solution, is placed for example on the substrate of a biochip that includes an enzyme that along with a co-enzyme or form of energy or catalyst, facilitates the conversion of either acrylamide to acrylonitrile or the conversion of acrylamide to ammonia. If acrylamide is detected in the sample food substance, the resultant concentration, as determined on the colorimetric scale, provides the consumer of the food substance an opportunity to reject or discard the substance prior to digestion, thus promoting good health and avoiding potential ingestion of relatively high concentrations of carcinogenic potent acrylamides. Another variation of the detection device above may utilize pH balance meter and system similar to the colorimetric system utilized above, but which allows a numeric or digital reading of the concentration of acrylamides present in the sample of food. Another variation of the detection device may utilize infrared (IR) detection using an IR sensor to measure a sample and quantify the concentration of acrylonitrile within the

sample by an absorption peak of the carbon-nitrogen ($\text{C}\equiv\text{N}$) triple bond in acrylonitrile in an IR spectra at 2250 cm^{-1} wavelength.